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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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ROYLANCE, ABRAMS, BERDO & GOODMAN, L.L.P.
1300 19TH STREET, N.W.
SUITE 600
WASHINGTON,, DC 20036

EXAMINER
KIM, CHONG R

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

	Application No.	**Applicant(s)**
Office Action Summary	10/798,860	LIM ET AL.
	Examiner	**Art Unit**	
	Charles Kim	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 September 2007*.

2a)☐ This action is **FINAL**.　　2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-76* is/are pending in the application.

　　4a) Of the above claim(s) *15-62 and 64-76* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2,5,8-10,13-14,63* is/are rejected.

7)☒ Claim(s) *3,4,6,7,11 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 July 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☒ All　b)☐ Some *　c)☐ None of:

　　1.☒ Certified copies of the priority documents have been received.

　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/24/06, 8/2/07*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Restriction Requirement

1.   Applicant's election without traverse of Species 1 (claims 1-14 and 63) in the reply filed

on September 19, 2007 is acknowledged. Claims 15-62, 64-76 are withdrawn from further

consideration by the Examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Double Patenting

        The nonstatutory double patenting rejection is based on a judicially created doctrine
grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or
improper timewise extension of the "right to exclude" granted by a patent and to prevent possible
harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection
is appropriate where the conflicting claims are not identical, but at least one examined
application claim is not patentably distinct from the reference claim(s) because the examined
application claim is either anticipated by, or would have been obvious over, the reference
claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re
Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225
USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re
Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163
USPQ 644 (CCPA 1969).
        A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may
be used to overcome an actual or provisional rejection based on a nonstatutory double patenting
ground provided the conflicting application or patent either is shown to be commonly owned
with this application, or claims an invention made as a result of activities undertaken within the
scope of a joint research agreement.
        Effective January 1, 1994, a registered attorney or agent of record may sign a terminal
disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR
3.73(b).

2.   Claim 1 is rejected on the ground of nonstatutory obviousness-type double patenting as

being unpatentable over claim 1 of U.S. Patent No. 7,321,690, in view of the article entitled

"Extraction of Unconstrained Caption Text from General-Purpose Video" by Crandall (hereinafter "Crandall").

Referring to claim 1 of the instant application, claim 1 of the '690 patent discloses all the claimed features except for the image binarization and character recognition part.

Crandall discloses an image binarization part for comparing pixels in the character blocks with a pixel threshold, binarizing the pixels in the character blocks into a brightness value for a character pixel and a brightness value for a background pixel based on the comparison, and binarizing pixels in the background blocks into the brightness value for a background pixel; and a character recognition part for recognizing characters in the binarized image [pages 75-97. Crandall discloses several binarization techniques for binarizing pixels in an image into a brightness value for a character pixel and a brightness value for a background pixel by comparing pixel values with a pixel threshold. The result of one of these techniques is illustrated in figure 4.3.]

Crandall also discloses a character recognition part for recognizing characters in a binarized image [pages 75-97].

Claim 1 of the '690 patent and Crandall are combinable because they are both concerned with character image processing systems. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify claim 1 in view of Crandall. The reason for doing so would have been to bridge the gap between character localization and recognition in order to meet the eventual goal of recognizing the text appearing in the image [Crandall, page 75]. Therefore, it would have been obvious to combine claim 1 of the '690 patent with Crandall to obtain the invention as specified in claim 1 of the instant application.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1, 2, 63 are rejected under 35 U.S.C. 103(a) as being unpatentable over the

combination of Crandall and Feng, U.S. Patent Application Publication No. 2004/0120598

(hereinafter "Feng").

Referring to claim 1, Crandall discloses a device for recognizing characters in an image,

comprising:

an input part for receiving the image [pages 18-19];

an image binarization part for classifying the received image into character blocks and

background blocks [pages 18-19], comparing pixels in the character blocks with a pixel

threshold, binarizing the pixels in the character blocks into a brightness value for a character

pixel and a brightness value for a background pixel based on the comparison, and binarizing

pixels in the background blocks into the brightness value for a background pixel [pages 75-97.

Crandall discloses several binarization techniques for binarizing pixels in an image into a

brightness value for a character pixel and a brightness value for a background pixel by

comparing pixel values with a pixel threshold. The result of one of these techniques is illustrated

in figure 4.3.]; and

a character recognition part for recognizing characters in a binarized image [pages 75-

97].

Crandall does not explicitly disclose a blurring decision part for calculating an average

energy ratio of the character blocks and comparing the average energy ratio with a predetermined

threshold to determine whether the received image is blurred. However, this feature was

exceedingly well known in the art. For example, Feng discloses a blurring decision part for

calculating an average energy ratio of the image blocks and comparing the average energy ratio

with a predetermined threshold to determine whether the received image is blurred [pars. 25, 35-

39. Note that a "blur indicator" is determined by calculating an average energy ratio of the

image blocks (par. 35). The blur indicator is subsequently compared with a predetermined

threshold to determine whether the image is blurred (pars. 36-39).].

Crandall and Feng are combinable because they are both concerned with processing

digital images. At the time of the invention, it would have been obvious to a person of ordinary

skill in the art to modify Crandall to include the blurring decision part of Feng. The reason for

doing so would have been to detect and reduce any blur in the characters of the image. The

detection and reduction of blur would have produced characters that are sharp and easier to

recognize, thereby enhancing the character recognition process. Therefore, it would have been

obvious to combine Crandall with Feng to obtain the invention as specified in claim 1.[1]

Referring to claim 2, Crandall further discloses a block classification part for dividing the

received image into blocks, and classifying the divided blocks into character blocks and

background blocks [18-19].

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[1] The Examiner notes that in combining Crandall with Feng, it would have been logical to apply Feng's blur detection and reduction process prior to Crandall's binarization and character recognition process, in order to ensure that the characters are sharp and easily recognizable. Consequently, by applying Feng's blur detection and reduction technique, any blur in the image would have been reduced prior to binarization and therefore, the binarization process would have been applied to an image that is not blurred.

Feng further discloses a character block energy calculation part for calculating an average energy ratio of the image blocks and a blurring detection part for comparing the average energy ratio with a predetermined threshold, and determining whether the image is blurred based on the comparison [pars. 25, 35-39].

Referring to claim 63, see the rejection of at least claim 1 above. The method of performing the steps recited in claim 63 is inherent in the system disclosed by Crandall and Feng, as recited in claim 1.

4.   Claims 5, 8, 9, 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Crandall, Feng, and the article entitled "Adaptive, Quadratic, Preprocessing of Document Images for Binarization" by Mo et al. (hereinafter "Mo").

Referring to claim 5, Crandall further discloses a block classification part for dividing the image into blocks, and classifying the divided blocks into character blocks and background blocks [pages 18-19];

a binarization part for generating a pixel threshold for distinguishing between character pixels and background pixels in the character blocks; and for comparing pixels in the character blocks with the threshold, binarizing the pixels into a first brightness value for a character pixel and a second brightness value for a background pixel based on the comparison, and binarizing pixels in the background blocks output from the block classification part into the second brightness value [pars. 25, 35-39. Note that a "blur indicator" is determined by calculating an average energy ratio of the image blocks (par. 35). The blur indicator is subsequently compared with a predetermined threshold to determine whether the image is blurred (pars. 36-39).].

Crandall does not explicitly disclose an edge enhancement part for enhancing edges of the character blocks using a relationship between neighboring pixels in the character blocks. However, this feature was exceedingly well known in the art. For example, Mo discloses an edge enhancement system for enhancing edges of character blocks using a relationship between neighboring pixels in the character blocks [pages 994-999, sections II and III].

Crandall, Feng, and Mo are combinable because they are all concerned with processing digital images. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Crandall and Feng to include the edge enhancement part of Mo. The reason for doing so would have been to enhance the character recognition process by providing characters having better defined edges and separation [Mo, page 993, left column]. Therefore, it would have been obvious to combine Crandall and Feng with Mo to obtain the invention as specified in claim 5.

Referring to claim 8, Mo further discloses:

a first threshold calculation part for calculating a first threshold for classifying pixels in into character pixels and background pixels [page 992, section I. Note that the single threshold used in the global thresholding process is construed as the first threshold.];

a mean computation part for classifying pixels into character pixels and background pixels on the basis of the first threshold [page 992, section I. Note that a two output level image is produced based on the threshold, one level representing characters and the other level representing background.], and calculating mean brightness values (average gray-level) for character pixels and background pixels in the image [page 995, top right column];

a normalization part for normalizing the pixels in the character block using a mean

brightness value for a character pixel and a mean brightness value for the background pixel

output from the mean computation part so that the character pixels have a value close to ' 1' and

the background pixels have a value close to '0' [page 995];

a quadratic operation part for performing a quadratic operation on the normalized

character block to enhance edges of the character block and reduce noises of the character block

[pages 994-995. Note that the normalized image is sent to the adaptive preprocessor, where a

quadratic operation is performed to enhance edges and reduce noise.]; and

a second threshold calculation part for normalizing the first threshold to calculate a

second threshold for classifying the pixels into character pixels and background pixels, and

outputting the second threshold as a threshold for the binarization part [page 996, top left

column. Note that the global threshold value is normalized and output as a second threshold for

the binarization process].

Referring to claim 9, Crandall further discloses:

a block classification part for dividing the image into the blocks, and classifying the

divided blocks into character blocks and background blocks [pages 18-19];

a block growing part for growing the character blocks to restore a block including

character pixels, incorrectly classified as a background block, to a character block [pages 20-22];

a binarization part for comparing pixels in the character blocks with a threshold generated

for distinguishing between character pixels and background pixels, binarizing the pixels into a

first brightness value for a character pixel and a second brightness value for a background pixel

according to the comparison result, and binarizing pixels in the background pixels into the

second brightness value [pages 75-97. Crandall discloses several binarization techniques for binarizing pixels in an image into a brightness value for a character pixel and a brightness value for a background pixel by comparing pixel values with a pixel threshold. The result of one of these techniques is illustrated in figure 4.3.].

Crandall does not explicitly disclose an edge enhancement part for enhancing edges of the character block output from the block growing part using a relationship between neighboring pixels in the character blocks. However, this feature was exceedingly well known in the art. For example, Mo discloses an edge enhancement system for enhancing edges of character blocks using a relationship between neighboring pixels in the character blocks [pages 994-999, sections II and III].

Crandall, Feng, and Mo are combinable because they are all concerned with processing digital images. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to modify Crandall and Feng to include the edge enhancement part of Mo. The reason for doing so would have been to enhance the character recognition process by providing characters having better defined edges and separation [Mo, page 993, left column]. Therefore, it would have been obvious to combine Crandall and Feng with Mo to obtain the invention as specified in claim 9.

Referring to claim 13, Mo discloses a noise reduction part for reducing noise of the received image and outputting the noise-reduced image to an image binarization part [pages 994-995. Note that the adaptive quadratic preprocessor performs the dual function of edge enhancement and noise reduction on the image before it is sent to the image binarization part.].

5.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination

of Crandall, Feng, Mo, and Laumeyer et al., U.S. Patent No. 6,449,384 (hereinafter

"Laumeyer").

        Referring to claim 10, Crandall further discloses a block growing part for growing the

character blocks to restore a block including character pixels, incorrectly classified as a

background block, to a character block, as explained in claim 9 above. However, Crandall does

not explicitly disclose that the block growing part includes a dilation and closing part for dilating

and eroding respectively, the character block.

        Laumeyer discloses a block growing part that includes a dilation part and a closing part

for dilating and eroding respectively image blocks [col. 6, ll. 14-60].

        At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to modify Crandall's block growing part in view of Laumeyer's teachings. The reason for

doing so would have been to provide the capability of rapidly analyzing images to detect and

classify objects of interest, thereby enhancing the character extraction process [Laumeyer,

abstract]. Therefore, it would have been obvious to combine Crandall, Feng, and Mo with

Laumeyer to obtain the invention as specified in claim 10.

6.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination

of Crandall, Feng, Mo, and Chun, U.S. Patent No. 5,949,916 (hereinafter "Chun").

        Referring to claim 14, Mo further discloses that the noise reduction part comprises a

direction filter [page 995, left column], but does not explicitly disclose that the filter is a Lee

filter. However, Lee filters were exceedingly well known in the art. For example, Chun discloses a Lee filter for reducing noise in an image [col. 1, ll. 27-35].

It would have been obvious to include Chun's Lee filter in Crandall, Feng and Mo. The reason for doing so would have been to enhance the flexibility of the noise reduction process by providing a filter that has weights that vary depending on the variance of noise in the image.

Allowable Subject Matter

7.   Claims 3-4, 6-7, 11-12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
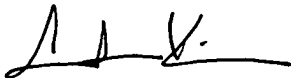
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Kim whose telephone number is 571-272-7421. The examiner can normally be reached on Mon thru Thurs 8:30am to 6pm and alternating Fri 9:30am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles Kim
Patent Examiner
Art Unit 2624
chongr.kim@uspto.gov

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